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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/781,792	TSURUOKA ET AL.	
	Examiner	Art Unit	
	THOMAS RICHARDSON	2444	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10,12,14,16,18 and 20-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10,12,14,16,18 and 20-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-8, 10, 12, 14, 16, 18, and 20-31 are pending for examination.

Claims 9, 11, 13, 15, 17, 19, and 32 are cancelled.

Claims 1-8, 10, 12, 14, 16, 18, and 20-31 are amended.

Claims 1-8, 10, 12, 14, 16, 18, and 20-31 are rejected.

Response to Arguments

1. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection. Applicant's arguments regarding newly added limitations are addressed below in view of new grounds of rejection and reference Birenback (US 6 594 704).

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 10, 16, 20, 24, 28 rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0204618, Foster et al, WO 99/14931, Dalton et al, and US 6 594 704, Birenback et al.

4. As per claim 10, Foster teaches a method of maintaining a routing table in a system that includes a packet forwarder and a packet control device, the packet forwarder including a plurality of network interfaces (Figure 2A, where each packet forwarder has multiple connection interfaces), the packet control device including a plurality of network interface and a plurality of virtual interfaces each of the virtual interfaces having address information that is associated with one of the network

interfaces of the packet forwarder (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN), the method comprising:

dividing the network interfaces of the packet control device and the virtual interfaces into a plurality of groups (Figures 2B and 2C, where the virtual and real addresses are kept separately and routed accordingly);

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

maintaining a routing table of each for the groups using a routing process associated with each of the groups (Figures 2B and 2C, where the virtual and real addresses are kept separately and routed accordingly).

Foster does not expressly teach that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

5. As per claim 16, Foster teaches a computer-readable storage for controlling a computer, comprising a computer program for maintaining a routing table (page 2, paragraph [0013], where the system is a software facility), the packet forwarder including a plurality of network interfaces (Figure 2A, where each packet forwarder has multiple connection interfaces), the packet control device including a plurality of network interfaces and a plurality of virtual interfaces each of the virtual interfaces having address information that is associated with one of the network interfaces of the packet

forwarder (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN), the computer program including computer executable instructions which, when executed by the computer, cause the computer to perform:

dividing the network interfaces of the packet control device and the virtual interfaces into a plurality of groups (Figures 2B and 2C, where the virtual and real addresses are kept separately and routed accordingly);

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

maintaining a routing table of each of the groups using a routing process associated with each of the groups (Figures 2B and 2C, where the virtual and real addresses are kept separately and routed accordingly).

Foster does not expressly teach that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

6. As per claim 20, Foster teaches a router control device (abstract, where the system processes received data for routing through a network) comprising:

a virtual interface setting unit that creates and manages virtual interfaces on a router control device according to corresponding network interfaces of a forwarder, each of the virtual interfaces having address information that is associated with one of the network interfaces of the forwarder (Page 5,

paragraph [0029], where the IFM maintains a virtual identifier table for each of its ports);

a routing unit that generates a routing table for the forwarder based on routing information in routing information packets received at the network interface of the forwarder and transferred by the forwarder to the router control device (Figures 2B and 2C and accompanying description beginning page 5, paragraph [0032], where the device forms routing information tables according to the source and destination identifiers);

a deciding unit that decides on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

a registering unit that registers the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

a routing information storage unit that stores a routing table created and managed by the routing unit for packet forwarding between the virtual interfaces that are associated with an address of the virtual interface (Page 5, paragraph [0029], where each IFM contains a virtual identifier table for each of its ports).

Foster does not expressly teach that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables

corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

7. As per claim 24, Foster teaches a method of maintaining a routing table (abstract), comprising:

creating and managing virtual interfaces on a router control device according to corresponding network interfaces of a forwarder, each of the virtual interfaces having address information that is associated with one of the network interfaces of the forwarder (Page 5, paragraph [0029], where the IFM maintains a virtual identifier table for each of its ports);

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined

dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

generating a routing table for the forwarder based on routing information in routing information packets received at the network interface of the forwarder and transferred by the forwarder to the router control device (Figures 2B and 2C and accompanying description beginning page 5, paragraph [0032], where the device forms routing information tables according to the source and destination identifiers); and

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

storing a routing table created and managed by the routing unit for packet forwarding between the virtual interfaces (Page 5, paragraph [0029], where each IFM contains a virtual identifier table for each of its ports).

Foster does not expressly teach that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table

contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

8. As per claim 28, Foster teaches a computer-readable storage for controlling a computer, comprising a computer program for maintaining a routing table (abstract), including computer executable instructions which, when executed by the computer, cause the computer to perform:

creating and managing virtual interfaces on a router control device according to corresponding network interfaces of a forwarder, each of the virtual interfaces having address information that is associated with one of the network interfaces of the forwarder (Page 5, paragraph [0029], where the IFM maintains a virtual identifier table for each of its ports);

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network

(paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

generating a routing table for the forwarder based on routing information in routing information packets received at the network interface of the forwarder and transferred by the forwarder to the router control device (Figures 2B and 2C and accompanying description beginning page 5, paragraph [0032], where the device forms routing information tables according to the source and destination identifiers); and

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

storing a routing table created and managed by the routing unit for packet forwarding between the virtual interfaces (Page 5, paragraph [0029], where each IFM contains a virtual identifier table for each of its ports).

Foster does not expressly teach that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table

contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

9. As per claim 32, Dalton teaches a method performed by a processor of controlling a router, comprising:

connecting a router control device to a forwarder through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device);

creating and managing interfaces, each having address information that is associated with one of a plurality of network interfaces of the forwarder, on the router control device (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device); and

outputting (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device)

Dalton does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

a virtual interface that has address information associated with the network interface of the packet forwarder (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN);

a transmitted packet reception unit that receives the routing information packet and that associates the routing information packet with the virtual interface (Figure 3, Virtual Identifier Translation Table 325).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the system of Dalton. Dalton generally teaches that the central routing authority oversees packet transfer over local gateways. One way of rerouting packets involves using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Dalton's system, as it would allow the central authority to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

10. Claims 1-8, 12, 14, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0204618, Foster et al, US 6 496 935, Fink et al, WO 99/14931, Dalton et al, and US 6 594 704, Birenback et al.

11. As per claim 1, Fink teaches a packet control system (abstract) comprising:

a packet forwarder that transfers a packet received from a network interface to another network interface (Figure 1, pre-filtering module); and

a packet control device that routes the packet using a routing process (Figure 1, firewall 18, where the routing information is filter information), wherein

the packet forwarder includes

a received packet transfer unit that transmits to the packet control device a routing information packet received from the network interface (Column 6, line 65 to column 7, line 16, where the firewall receives the packet and determines whether the packet should be permitted to enter and/or leave the network), and wherein

the packet control device includes

a transmitted packet reception unit that receives the routing information packet (Column 6, line 67, where the firewall inspects the packets, which thereby have been transferred from the pre-filtering module to the firewall), that associates the routing information packet with the interface (Column 7, lines 2-4, where the firewall determines if the connection should be permitted to pass through the device interface), and that delivers the routing information packet to the routing process (Column 7, lines 1-4, where the analysis module performs the determination); and

a transmitted packet transfer unit that receives the routing information packet sent by the routing process, and that transmits the routing information packet to the packet forwarder (Column 7, lines 17-21, where the firewall passes the relevant instructions concerning the packet to the pre-filtering module).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

a virtual interface that has address information associated with the network interface of the packet forwarder (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

a transmitted packet reception unit that receives the routing information packet and that associates the routing information packet with the virtual interface (Figure 3, Virtual Identifier Translation Table 325).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (Column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they

allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

12. As per claim 2, Fink teaches a packet control device which constructs a routing table for a packet forwarder controlled by the packet control device, using a routing process running on the packet control device, the packet control device comprising:

a transmitted packet reception unit that receives the routing information packet transmitted from the packet forwarder (Column 6, line 67, where the firewall

inspects the packets, which thereby have been transferred from the pre-filtering module to the firewall), that associates the routing information packet with the interface corresponding to an incoming network interface of the packet forwarder (Column 7, lines 2-4, where the firewall determines if the connection should be permitted to pass through the device interface), and that transmits the routing information packet to the routing process (Column 7, lines 1-4, where the analysis module performs the determination); and

a transmitted packet transfer unit that receives the routing information packet sent by the routing process, and that transmits the routing information packet to the packet forwarder (Column 7, lines 17-21, where the firewall passes the relevant instructions concerning the packet to the pre-filtering module).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network

manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

a virtual interface that has address information associated with the network interface of the packet forwarder (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table

contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

13. As per claim 3, Fink-Dalton-Foster-Birenback further teaches:

a routing table transfer unit that acquires a routing table updated by the routing process, and that transmits the routing table to the packet forwarder (Fink, column 4, lines 51-55, where the firewall sends packet passage information to the pre-filtering module, which allows for forwarding and routing by the forwarder).

14. As per claim 4, Fink teaches a packet control device which constructs a routing table for a packet forwarder controlled by the packet control device which determines an outgoing network interface of the packet received at an incoming network interface of the packet forwarder (column 5, lines 47-59, where the rule base establishes forwarding rules for packets, permitting them to be forwarded through to the output interface or

dropping them if they violate the rules of the rule base), the packet control device comprising:

a plurality of network interfaces (column 7, lines 28-32, where the pre-filtering module features a plurality of network interfaces).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

a plurality of virtual interfaces each having address information that is associated with one of the network interfaces of the packet forwarder (page 7, paragraph [0044], where the computing device uses virtual identifiers when transmitting and receiving data communications), the network interfaces of the packet control device and the virtual interfaces being divided into a plurality of groups (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN), wherein

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network

manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

the packet control device routes the packet using a routing process associated with each of the groups considering interfaces belongs to the groups to create a dedicated routing table for each, the each of the groups corresponds to a separate device (Figures 2B and 2C, where the virtual and real addresses are kept separately and routed accordingly).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

15. As per claim 5, Fink-Dalton-Foster-Birenback further teaches wherein the virtual interfaces are grouped for each packet forwarder, and the packet control device maintains routing tables using a routing process associated with each of the virtual interfaces grouped (Foster, Figures 2B and 2C, where each table uses different routing processes to make connections).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include separate routing tables for virtual and real addresses. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (column 7, line 11). One way of rewriting addresses involves

using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

16. As per claim 6, Fink teaches a packet forwarder which forwards a packet from its network interface to its other network interface according to its routing table that makes a destination address of a packet associate with a next transfer destination (Column 5, lines 51-54, where the system routes according to filtering rules), comprising a received packet transfer unit that transmits a routing information packet received at the network interface to a packet control device that maintains the routing table of the packet forwarder using a routing process that generates the routing table based on routing information no the packet received at the network interface (column 9, lines 1-16, where the pre-filtering module receives packets from an external source, such as a MAC interface, and forwards the packet to the firewall through the firewall interface).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

a virtual interface that has address information associated with the network interface of the packet forwarder (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

a transmitted packet reception unit that receives the routing information packet and that associates the routing information packet with the virtual interface (Figure 3, Virtual Identifier Translation Table 325).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (Column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they

allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

17. As per claim 7, Fink-Dalton-Foster-Birenback further teaches a routing table setting unit that receives the routing table from the packet control device, and that sets the routing table to the packet forwarder (Fink, Column 7, line 62 through column 8, line 3, where the pre-filtering module contains a connection database which stores in its memory instructions from the firewall).

18. As per claim 8, Fink teaches a method of maintaining a routing table using a routing process (abstract, where the pre-filtering module performs a limited set of actions with packets previously permitted by the firewall), the method comprising:

receiving a routing information packet which is received by a packet forwarder (column 8, lines 12-15, where the pre-filtering module sends information to the firewall for processing);

delivering the routing information packet to the routing process (column 6, line 65 through column 7, line 3, where the firewall passes the packet to the analysis module for determination of whether the packet is allowed);

receiving the routing information packet sent by the routing process (column 7, lines 17-21, where the firewall forwards the relevant instructions to the pre-filtering module, inherently receiving them from the analysis module for forwarding); and

transmitting the routing information packet to the packet forwarder for transmitting from its network interface (column 7, lines 17-21, where the firewall forwards the relevant instructions for the packet to the pre-filtering module).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network

(paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

associating the routing information packet with a virtual interface that has address information associated with a network interface of the packet forwarder (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (Column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the

firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

19. As per claim 12, Fink teaches a method of maintaining a routing table of a packet forwarder (Column 7, line 62 through column 8, line 3, where the pre-filtering module contains a connection database which stores in its memory instructions from the firewall), the method comprising:

receiving a routing information packet from a network interface of a packet forwarder (Figure 1, where packets enter and leave the gateway through network interfaces before they are processed by the pre-filtering module and the firewall,

also column 9, lines 1-16, where the pre-filtering module receives packets from an external source); and

transferring the routing information packet to a packet control device, wherein the routing table makes a destination address of a packet associate with a next transfer destination (Column 6, line 65 to column 7, line 16, where the firewall receives the packet and determines whether the packet should be permitted to enter and/or leave the network, also column 9, lines 1-16, where the pre-filtering module receives packets from an external source and forwards the packet to the firewall through the firewall interface).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

associating the routing information packet with a virtual interface that has address information associated with a network interface of the packet forwarder (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (Column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table

contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

20. As per claim 14, Fink teaches a computer-readable storage for controlling a computer, comprising a computer program for routing a packet using a routing process, including computer executable instructions which, when executed by the computer (Column 3, line 63 through column 4, line 6, where the method can be implemented as software), cause the computer to perform:

receiving a routing information packet from a network interface of a packet forwarder (Figure 1, where packets enter and leave the gateway through network interfaces before they are processed by the pre-filtering module and the firewall);

transmitting the routing information packet to a packet control device (Column 6, line 65 to column 7, line 16, where the firewall receives the packet and determines whether the packet should be permitted to enter and/or leave the network);

receiving the routing information packet from the packet forwarder (Figure 3, step 4b, where the packet is received by firewall from pre-filtering module);

transmitting the routing information packet to the routing process (column 6, line 65 through column 7, line 3, where the firewall passes the packet to the analysis module for determination of whether the packet is allowed);

receiving the routing information packet transmitted from the routing process (column 7, lines 17-21, where the firewall forwards the relevant instructions to the pre-filtering module, inherently receiving them from the analysis module for forwarding); and

transmitting the routing information packet to the packet forwarder (column 7, lines 17-21, where the firewall forwards the relevant instructions for the packet to the pre-filtering module).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

associating the routing information packet with a virtual interface that has address information associated with the network interface (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (Column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

21. As per claim 18, Fink teaches a computer-readable storage for controlling a computer, comprising computer program for maintaining a routing table of a packet forwarder, including computer executable instructions which, when executed by the computer (Column 3, line 63 through column 4, line 6, where the method can be implemented as software), cause the computer to perform:

receiving a routing information packet from a network interface of the packet forwarder (Figure 1, where packets enter and leave the gateway through network interfaces before they are processed by the pre-filtering module and the firewall,

also column 9, lines 1-16, where the pre-filtering module receives packets from an external source); and

transferring the routing information packet to the packet control device, wherein the routing table makes a destination address of a packet associate with a next transfer destination (Column 6, line 65 to column 7, line 16, where the firewall receives the packet and determines whether the packet should be permitted to enter and/or leave the network, also column 9, lines 1-16, where the pre-filtering module receives packets from an external source and forwards the packet to the firewall through the firewall interface).

Fink does not teach a specific rule or routing scheme to use with the firewall, only references a general set of rules. Foster teaches a system that uses virtual identifiers to process data routed through a network wherein the packet control device includes:

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

associating the routing information packet with a virtual interface that has address information associated with the network interface (page 5, paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a virtual routing table such as that Foster teaches in the firewall system of Fink. Fink teaches that the analysis module of the firewall determines actions to take with the packet, including that of rewriting address fields (Column 7, line 11). One way of rewriting addresses involves using virtual addresses, which simplify routing, as they allow a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Fink's system, as it would allow the firewall to work with another layer of security and simplicity, as well as the ability to work on various network types.

Neither Fink nor Foster expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Fink or Foster. Fink's system generally allows for a device to filter and process packets. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table

contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

22. Claims 21-23, 25-27, and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0204618, Foster et al, WO 99/14931, Dalton et al, and US 6 594 704, Birenback et al as applied to claims 20, 24, and 28 above, and further in view of US 6 272 522, Lin et al.

23. As per claim 21, neither Foster, Dalton, nor Birenback expressly teaches a specific method of generating or updating the routing tables for his system. Lin teaches a method of routing within a packet switching system comprising:

a tunnel transfer unit that transfers the routing information packet via a communication path that connects between the network interface and the virtual interface (Column 10, lines 17-42, where the packet is sent from the network interface of the switching processor to the virtual interface of the control processor), wherein

the routing information storage unit stores the routing information in the routing information packet transferred by the tunnel transfer unit (Column 6, lines 43-54, where the raw load data is sent to the master module to determine the new load balancing), and

the routing unit generates the routing table for the forwarder based on the routing information stored in the routing information storage unit (Column 6, lines 4-6, where the control processor writes the new load balancing information into the shared memory for use by the switching processor).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a control processor for generating and updating the routing tables such as that disclosed by Lin in the routing system as taught by Foster. A central control processor Such as that in Lin allows the system to work faster, making the routing and switching able to occur more efficiently, as they can occur simultaneously (Lin, column 7, lines 18-24).

24. As per claim 22, neither Foster, Dalton, nor Birenback expressly teaches a specific method of generating or updating the routing tables for his system. Lin teaches a method of routing within a packet switching system comprising:

a routing table transmission unit that acquires the routing table and that transmits the routing table to the forwarder (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor), wherein

the routing unit generates the routing table for the forwarder based on the routing information stored in the routing information storage unit (Column 6, lines 55-60,

where the switching processor accesses the routing table stored in the shared memory).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a control processor for generating and updating the routing tables such as that disclosed by Lin in the routing system as taught by Foster. A central control processor Such as that in Lin allows the system to work faster, making the routing and switching able to occur more efficiently, as they can occur simultaneously (Lin, column 7, lines 18-24).

25. As per claim 23, Lin teaches a router control system which includes a forwarder and a router control device (Figure 1, pre-filtering module and firewall), wherein

the router control device includes

a tunnel transfer unit that transfers the routing information packet via a communication path that connects between the network interface and the virtual interface (Column 10, lines 17-42, where the packet is sent from the network interface of the switching processor to the virtual interface of the control processor);

a routing unit that generates the routing table for the forwarder based on the routing information stored in the routing information storage unit (Column 2, line 66, through column 3, line 3, where the control processor server to generate configuration information for the switching processors); and

the routing table transmission unit that acquires the routing table, and transmits the routing table to the forwarder (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor), and

the forwarder forwards a packet from its network interface to its other network interface according to its routing table (abstract, where the switching processors route received packets through to an external network), and includes a received packet transfer unit that transmits a routing information packet received at the network interface to the router control device that maintains the routing table of the forwarder using a routing process (Column 6, lines 43-54, where the raw load data is sent to the control processor, and after the data is processed, it is written into shared memory and used by the switching processors (Column 6, lines 4-6)).

Lin does not teach a virtual interface method for use with his routing system. Foster teaches a system that routes packets using virtual identifier, where the router control device includes:

a virtual interface setting unit that that creates and manages virtual interfaces on a router control device according to corresponding network interfaces of a forwarder, each of the virtual interfaces having address information that is associated with one of the network interfaces of the forwarder (Page 5, paragraph [0029], where the IFM maintains a virtual identifier table for each of its ports);

a deciding unit for deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing

information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

a registering unit for registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

a transmitting unit for transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

a routing information storage unit that stores routing information in the routing information packet transferred by the tunnel transfer unit (Page 5, paragraph [0029], where each IFM contains a virtual identifier table for each of its ports).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a virtual addressing method such as that taught by Foster in the system disclosed by Lin. Lin's system effectively reroutes packets, regardless of the packet type. Foster's virtual identifier method would simplify routing, as it allows a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]).

This would be beneficial in Lin's system, as it would allow the routing table to work with virtual as well as physical addresses, making it more versatile.

Neither Foster nor Lin expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

26. As per claim 25, neither Foster, Dalton, nor Birenback expressly teaches a specific method of generating or updating the routing tables for his system. Lin teaches a method of routing within a packet switching system comprising:

transferring the routing information packet via a communication path that connects between the network interface and the virtual interface (Column 10, lines 17-42, where the packet is sent from the network interface of the switching processor to the virtual interface of the control processor), wherein

the storing includes storing the routing information in the routing information packet transferred by the tunnel transfer unit (Column 6, lines 43-54, where the raw load data is sent to the master module to determine the new load balancing), and

the generating includes generating the routing table for the forwarder based on the routing information stored (Column 6, lines 4-6, where the control processor writes the new load balancing information into the shared memory for use by the switching processor).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a control processor for generating and updating the routing tables such as that disclosed by Lin in the routing system as taught by Foster. A central control processor Such as that in Lin allows the system to work faster, making the routing and switching able to occur more efficiently, as they can occur simultaneously (Lin, column 7, lines 18-24).

27. As per claim 26, neither Foster, Dalton, nor Birenback expressly teaches a specific method of generating or updating the routing tables for his system. Lin teaches a method of routing within a packet switching system comprising:

acquiring the routing table (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor); and

transmitting the routing table to the forwarder (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor), wherein

the generating includes generating the routing table for the forwarder based on the routing information stored (Column 6, lines 55-60, where the switching processor accesses the routing table stored in the shared memory).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a control processor for generating and updating the routing tables such as that disclosed by Lin in the routing system as taught by Foster. A central control processor Such as that in Lin allows the system to work faster, making the routing and switching able to occur more efficiently, as they can occur simultaneously (Lin, column 7, lines 18-24).

28. As per claim 27, Lin teaches a method of maintaining a routing table (Figure 1, pre-filtering module and firewall), comprising:

transferring the routing information packet by tunneling via a communication path that connects between the network interface and the virtual interface (Column 10, lines 17-42, where the packet is sent from the network interface of the switching processor to the virtual interface of the control processor);

generating a routing table for the forwarder based on the routing information stored (Column 2, line 66, through column 3, line 3, where the control processor server to generate configuration information for the switching processors);

acquiring the routing table (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor);

transmitting the routing table to the forwarder (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor);

forwarding a packet from a network interface of the forwarder to other network interface of the forwarder according to a routing table of the forwarder (abstract, where the switching processors route received packets through to an external network); and

transmitting a routing information packet received at the network interface of the forwarder to the router control device that maintains the routing table of the forwarder using a routing process (Column 6, lines 43-54, where the raw load data is sent to the control processor, and after the data is processed, it is written into shared memory and used by the switching processors (Column 6, lines 4-6)).

Lin does not teach a virtual interface method for use with his routing system. Foster teaches a system that routes packets using virtual identifier, where the router control device includes:

creating and managing virtual interfaces on a router control device according to corresponding network interfaces of a forwarder, each of the virtual interfaces having address information that is associated with one of the network interfaces of the forwarder (Page 5, paragraph [0029], where the IFM maintains a virtual identifier table for each of its ports);

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet

control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

storing routing information on the routing information in the routing information packet transferred (Page 5, paragraph [0029], where each IFM contains a virtual identifier table for each of its ports).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a virtual addressing method such as that taught by Foster in the system disclosed by Lin. Lin's system effectively reroutes packets, regardless of the packet type. Foster's virtual identifier method would simplify routing, as it allows a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Lin’s system, as it would allow the routing table to work with virtual as well as physical addresses, making it more versatile.

Neither Foster nor Lin expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

29. As per claim 29, neither Foster, Dalton, nor Birenback expressly teaches a specific method of generating or updating the routing tables for his system. Lin teaches a method of routing within a packet switching system wherein:

instructions further cause the computer to perform transferring the routing information packet via a communication path that connects between the network interface and the virtual interface (Column 10, lines 17-42, where the packet is sent from the network interface of the switching processor to the virtual interface of the control processor), wherein

the storing includes storing the routing information in the routing information packet transferred by the tunnel transfer unit (Column 6, lines 43-54, where the raw load data is sent to the master module to determine the new load balancing), and

the generating includes generating the routing table for the forwarder based on the routing information stored (Column 6, lines 4-6, where the control processor writes the new load balancing information into the shared memory for use by the switching processor).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a control processor for generating and updating the routing tables such as that disclosed by Lin in the routing system as taught by Foster. A central control processor Such as that in Lin allows the system to work faster, making the routing and switching able to occur more efficiently, as they can occur simultaneously (Lin, column 7, lines 18-24).

30. As per claim 30, neither Foster, Dalton, nor Birenback expressly teaches a specific method of generating or updating the routing tables for his system. Lin teaches a method of routing within a packet switching system wherein:

the instructions further cause the computer to perform:

acquiring the routing table (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor); and

transmitting the routing table to the forwarder (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor), wherein

the generating includes generating the routing table for the forwarder based on the routing information stored (Column 6, lines 55-60, where the switching processor accesses the routing table stored in the shared memory).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a control processor for generating and updating the routing tables such as that disclosed by Lin in the routing system as taught by Foster. A central control processor Such as that in Lin allows the system to work faster, making the routing and switching able to occur more efficiently, as they can occur simultaneously (Lin, column 7, lines 18-24).

31. As per claim 31, Lin teaches a computer-readable storage for controlling a computer, comprising a computer program for maintaining a routing table, including computer executable instructions stored on a computer readable medium, wherein the instructions, when executed by the computer, cause the computer to perform:

transferring a routing information packet by tunneling via a communication path that connects between the network interface and the virtual interface (Column 10, lines 17-42, where the packet is sent from the network interface of the switching processor to the virtual interface of the control processor);

generating a routing table for the forwarder based on the routing information stored (Column 2, line 66, through column 3, line 3, where the control processor server to generate configuration information for the switching processors);

acquiring the routing table (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor);

transmitting the routing table to the forwarder (Column 6, lines 4-6, where the distribution data is written into the shared memory for use by the switching processor);

forwarding a packet from a network interface of the forwarder to another network interface of the forwarder according to a routing table of the forwarder (abstract, where the switching processors route received packets through to an external network); and

transmitting a routing information packet received at the network interface of the forwarder to the router control device that maintains the routing table of the forwarder using a routing process (Column 6, lines 43-54, where the raw load data is sent to the control processor, and after the data is processed, it is written into shared memory and used by the switching processors (Column 6, lines 4-6)).

Lin does not teach a virtual interface method for use with his routing system. Foster teaches a system that routes packets using virtual identifier, where the router control device includes:

creating and managing virtual interfaces on a router control device according to corresponding network interfaces of a forwarder, each of the virtual interfaces

having address information that is associated with one of the network interfaces of the forwarder (Page 5, paragraph [0029], where the IFM maintains a virtual identifier table for each of its ports);

deciding on, according to a routing protocol, a path to be selected based on information of the network interface and routing information which the packet control device exchanges with the other packet control device in a network (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path);

registering the path by the deciding to a routing table (paragraphs 16-17, where the path for the packet to be sent may be determined dynamically by the network manager, and each device may be configured along the path to be notified of the virtual path); and

transmitting the packet to the packet forwarder including the network interface that is associated with an address of the virtual interface (paragraph [0029], where the virtual identifier translation table reflects the IP ports related to the virtual interfaces of the VPN); and

storing routing information on the routing information in the routing information packet transferred (Page 5, paragraph [0029], where each IFM contains a virtual identifier table for each of its ports);

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a virtual addressing method such as that taught by Foster in the system

disclosed by Lin. Lin's system effectively reroutes packets, regardless of the packet type. Foster's virtual identifier method would simplify routing, as it allows a path to be reconfigured in a manner transparent to a source (Foster, page 3, paragraph [0019]). This would be beneficial in Lin's system, as it would allow the routing table to work with virtual as well as physical addresses, making it more versatile.

Neither Foster nor Lin expressly teaches that the packet forwarder and the routing device are located in separate networked devices. Dalton teaches a routing engine wherein:

the packet forwarder is connected to the packet routing control device through a network (page 22, lines 1-23, where the routing engine processes and returns a request for route information to a packet routing device).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a packet controller separate from the packet forwarder such as taught by Dalton in a packet forwarding system such as that taught by Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. In both systems, the device is required to route packets to a device through a network. Dalton's system benefits any forwarding system, as it provides a central routing authority, such that routing may be offloaded from the local gateways, allowing the system to function with a greater ability to meet set parameters (page 2, lines 13-23).

Neither Foster nor Dalton expressly teaches utilizing two routing tables. Birenback teaches a method of managing multiple VPNs within a device comprising:

a first routing table (column 4, lines 17-24, where multiple tables may exist within a router);

a second routing table (column 4, lines 17-24, where multiple tables may exist within a router);

the first routing table is updated based on a routing information on the second routing table (column 5, lines 3-7, where entries may be added to routing tables corresponding to virtual routers, also column 4, lines 43-50, where the integrated table contains prefix entries for routes indexed from VPN IDs, which are used in virtual routing tables).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize multiple routing tables such as taught by Birenback in a routing system such as that taught by either Dalton or Foster. Foster's system allows a packet forwarder to create virtual channels for a packet to travel through a network. Dalton teaches a routing system with a central authority for routing packets. Either system would benefit from utilizing multiple routing tables, along with pointers, such as taught by Birenback, as Birenback's system improves the speed and efficiency of route lookups and packet forwarding (column 2, lines 52-56).

Conclusion

32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Examiner would like to make some suggestions for expediting prosecution of application:

33. In independent claims, examiner recommends further defining the first and second routing tables and their relationship to each other and within the system. As presented, the first and second routing tables are presented to exist within the system, but their separate functions are not well defined. These, along with any other applicant clarifications, may help expedite prosecution, as they would help differentiate from prior art by more clearly defining the relationship and function of the two separate routing tables existing within the device.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS RICHARDSON whose telephone number is (571) 270-1191. The examiner can normally be reached on Monday through Thursday, 11am-6pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Vaughn can be reached on (571) 272-3922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TR
/William C. Vaughn, Jr./
Supervisory Patent Examiner, Art Unit 2444